MiniMag

Kit MiniMag **# 21 4211**

MULTIPLEX®

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Version 02

Examine your kit carefully!
MULTIPLEX model kits are subject to constant quality checks throughout the production process, and we sincerely hope that you are happy with the contents of your kit. However, we would ask you to check all the parts before you start construction, as **we cannot exchange components which you have already worked on**. If you find any part is not acceptable for any reason, we will readily correct or exchange it. Just send the component to our Model Department. Please be **sure** to include a brief description of the fault.
We are constantly working on improving our models, and for this reason we must reserve the right to change the kit contents in terms of shape or dimensions of parts, technology, materials and fittings, without prior notification. Please understand that we cannot entertain claims against us if the kit contents do not agree in every respect with the instructions and the illustrations.

Caution!
Radio-controlled models, and especially model aircraft, are by no means playthings. Building and operating them safely requires a certain level of technical competence and manual skill, together with discipline and a responsible attitude at the flying field. Errors and carelessness in building and flying the model can result in serious personal injury and damage to property. Since we, as manufacturers, have no control over the construction, maintenance and operation of our products, we are obliged to take this opportunity to point out these hazards, and to emphasise your personal responsibility.

Additional items required for the Mini Mag:
Adhesive and activator Use medium-viscosity cyano-acrylate adhesive ("medium cyano") in conjunction with activator ("kicker"). Do not use styrofoam cyano. Epoxy glues appear to produce strong joints, but the strength is only superficial and the hard adhesive tends to break away from the components under stress. Hot-melt glue can also be used.

MULTIPLEX radio control equipment for the Mini Mag:

	PiCO 5/6 UNI receiver	35 MHz A	Order No.	5 5920
	alternatively:	40 MHz	Order No.	5 5921
or:	*Micro IPD* UNI receiver	35 MHz A	Order No.	5 5971
	alternatively:	40 MHz	Order No.	5 5972
	Nano S UNI or HS 55 servo (2 x required)	Elevator / rudder	Order No.	6 5120
and (optional):				
	Nano S UNI or HS 55 servo (2 x required)	Ailerons	Order No.	6 5120
	300 mm UNI extension lead	Aileron servos, 2 x	Order No.	8 5031
	if necessary: 200 mm UNI separation filter cable	Aileron servos, 2 x	Order No.	8 5035

MagicMixer #1 for 3-channel transmitter without mixers		Order No.	7 3000
Y-lead (UNI) for 4-channel transmitter with separate rudder control		Order No.	8 5030

	MULTIcont X-16 UNI	Speed controller	Order No.	7 2271
	MULTIPLEX Permabatt NiMH flight battery (AA cells)	7 / 1500 mAh	Order No.	15 6030
or	MULTIPLEX Permabatt NiMH flight battery (AA cells)	8 / 1500 mAh	Order No.	15 6037
or	MULTIPLEX Li-Batt (Li-Po) flight battery P-CS	2 / 1-2000 mAh	Order No.	15 7016
or	MULTIPLEX Li-Batt (Li-Po) flight battery SH BX	2 / 1-2100 mAh	Order No.	15 7130

Battery charger:

MULTIcharger LN-5014 DC (charge current 100 mA … 5 A)	1 - 14 NiCd/ NiMH and 1 - 5 Li-Po cells	Order No.	9 2531

Optional:

Float set		Order No.	73 3069
Tuning 1: Easy Glider power set (3:1 gearbox and Permax 400)		Order No.	33 2688
plus 3.5 mm Ø propeller driver		Order No.	33 2310
and 8 x 3.8" propeller		Order No.	73 3139
Tuning 2: Powerset „sport" BL 22/18			
Contents: motor, propeller driver, speed controller, propeller		Order No.	33 2627

Tools:
Scissors, balsa knife, combination pliers, cross-point / slot-head screwdrivers for servo output arm screws and motor screws, soldering iron.

Note: please separate the illustrated pages from the centre of this booklet.

Specification:

Wingspan	1010 mm
Fuselage length overall	820 mm
All-up weight min.	580 g
Wing loading (FAI) min.	26 g/dm²
Power system min.	Permax 400 6V
RC functions	Elevator, rudder
and throttle; optional ailerons	

Important note

This model is not made of styrofoam™! It is not possible to glue the material using white glue or epoxy. Please be sure to use cyano-acrylate glue exclusively, preferably in conjunction with cyano activator ("kicker"). For all joints use medium-viscosity cyano-acrylate ("cyano"). When gluing Elapor® always use this procedure: spray one surface with activator, allow it to air-dry, then apply cyano to the other side. Join the parts and position them accurately immediately.

Please take care when working with cyano adhesives. These materials harden in seconds, so do not allow them to get onto your fingers or other parts of your body. It is important to wear goggles to protect your eyes. Keep the adhesive out of the reach of children.

1. Before starting construction

Please check that the contents of your kit are complete. You will find **Figs. 01 + 02** and the Parts List helpful for this.

2. Preparing the control snakes

Check the length of the elevator snake tubes **43** and **45** and shorten them if necessary.

	43	3 / 2 Ø x 275 mm
	45	2 / 1 Ø x 300 mm
Steel	**41**	0.8 Ø x 355 mm

Repeat the procedure with the rudder snake tubes **44** and **46**.

	44	3 / 2 Ø x 225 mm
	46	2 / 1 Ø x 275 mm
Steel	**42**	0.8 Ø x 325 mmplease insert!

3. Installing the snakes in the fuselage shells

Caution: it is important to glue the snake outer sleeves **43** and **44** to the fuselage shells over their full length, as this increases the strength of the tail boom considerably.
Check that the control snakes work smoothly, and be careful not to allow any glue to run inside the outer sleeves.

4. Left-hand fuselage shell:

Trim the shell using a balsa knife, as shown in **Fig. 03**.

Position the snake outer sleeve **43** in the front of the fuselage shell, as shown in **Fig. 05**. Lay the shell down flat, and glue the outer sleeve **43** to the external channel over its full length, using cyano.

Installing the servo

Set the servo to neutral (centre) from the transmitter, and fit the output arm on the output shaft at 90° to the servo case. Connect the pre-formed end of the steel elevator pushrod to the second hole from the inside of the servo output lever. Slip the inner tube **45** over the steel pushrod, and slide both into the outer sleeve **43** from the servo end. **Fig. 05**

Fit the servo in the left-hand fuselage shell from the side as shown. *If you wish to use different servos, it may be necessary to make minor adjustments here*. Tape the servo lead in the fuselage, so that it does not get in the way when gluing the fuselage shells together. Glue the servo to the fuselage with a drop of hot-melt glue at each mounting lug. **Fig. 05**

Glue together the wing bolt support components **33 / 34**. If finger power is not sufficient, press them together using combination pliers, then glue the assembly in the fuselage shell.

Place the latch clip **22** for the Canopy-Lock canopy retainer in the fuselage in such a way that the latch lug **23** fits between the clip **22** and the fuselage side: spray activator in the recess in the fuselage and allow it to air-dry. Now apply cyano to the joint surfaces of the latch clip and position it immediately. Apply more glue to reinforce the joint if necessary. **Fig. 07**

5. Option

If you wish, you can fit a tailwheel to your model. This is actually necessary if you intend to fit floats at a later date, as a water rudder is absolutely essential for this version, and this uses the installed tailwheel wire. ***Figs. 09 - 13*** *show the procedure.*
You will find a bending template in ***Figs. 12 + 12a****. The steel wire should be 1.3 mm Ø. The tube required is the remainder of part* ***44****. Cut the water rudder to shape from 3 mm Depron, and fix it inside the steel wire frame using adhesive tape. Cut a V-notch in both fuselage shells to accept the wire, as shown in* ***Fig. 10****, and pierce a hole in the tailplane for it;* ***Fig. 11****. If you fit the tailwheel, the integral foam tailskid on the fuselage should be cut off. Cut a slot in the rudder for the driver wire;* ***Fig. 10****.*

6. Right-hand fuselage shell:

Trim the shell using a balsa knife, as shown in **Fig. 04**.

Position the snake outer sleeve **44** in the front of the fuselage shell, as shown in **Fig. 06**. Lay the shell down flat, and glue the outer sleeve **44** to the outer channel over its full length, using cyano.

I**nstalling the servo**

Set the servo to neutral (centre) from the transmitter, and fit the output arm on the output shaft at 90° to the servo case. Connect the pre-formed end of the steel rudder pushrod to the innermost hole of the servo output lever. Slip the inner tube **46** over the steel pushrod, and slide both into the outer sleeve **44** from the servo end. **Fig. 06**

Glue the canopy latch clip in place; **Fig. 08**

7. Joining the fuselage shells

Start with the right-hand fuselage shell **4**. We recommend medium or thick cyano for this stage.
The fuselage shells **3** and **4** can now be glued together.

Check that the parts fit together snugly, and carry out any minor trimming required before reaching for the glue bottle. Glue the wing bolt support assembly **33 / 34** in one fuselage shell. Apply a thin coating of activator to the fuselage shell **4** and allow it to air-dry, then apply thick cyano to the mating surfaces of the fuselage shell **3**. Now join parts **3** and **4** carefully and align them quickly. The fuselage joint line must be straight, i.e. it must not be curved!
Figs. 14 - 15

8. Installing the undercarriage support
Fit the undercarriage support **74** on the underside of the fuselage "dry" (no glue), and press the spikes into the fuselage material. Remove the support, then carefully apply cyano to the joint surface on the fuselage, not forgetting the pierced holes. Apply activator thinly to the undercarriage support, and press it firmly into place. **Fig. 16**

9. Preparing the motor installation
You now have to decide which power system you want to install:

1. Standard - Permax 400, direct drive
5 x 4" Guenter or MPX propeller
Included in the kit **Fig. 17**

2. Standard G Permax 400 with 3:1 gearbox
Fig. 20

Easy Glider E power set	
(Permax 400 with 3:1 gearbox	**# 33 2688**
plus 3.5 mm Ø propeller driver	**# 33 2310**
and 8 x 3.8" propeller	**# 73 3139**

3. "Sport" power set: BL-X 22-18 **# 33 2627**
The set includes the propeller driver and propeller

Attach the motor **50** to the motor mount **60 + 61**. If you are using the geared motor, cut down the motor mount **61** to a length of 25 mm. **Fig. 20**

10. Connecting the motor
Carry out a test-run! The propeller must always rotate anti-clockwise when viewed from the front. Reverse the motor terminal connections if the motor spins in the wrong direction.

11. Installing the motor
Dry-fit the motor assembly (no glue): **Figs. 19 and 21**; carry out any minor adjustments required. Apply CA to the whole surface of the motor mount and carefully fit the assembly in the fuselage. **Fig. 18**

12. Installing the canopy latch lugs in the canopy
The canopy latch lugs **23** are fitted in the canopy **5** as a mirror-image pair, i.e. with the lugs facing inward. Apply CA to the ridged areas - in this case activator should not be used - then push the lugs into the slots in the canopy. Fit the canopy on the model, and allow the latch lugs to engage in the latch clips **22**. Immediately position the canopy accurately. Allow the glue to harden for about one minute, then carefully open the canopy again. Apply activator to the joint areas between the latch lugs and the canopy.
Fig. 22

Fit the canopy on the fuselage again, and check that it fits neatly. **Fig. 23**

13. Attaching the horn to the elevator
Fit the pushrod connector **25** in the outermost hole of the elevator horn **24**, and secure it with the washer **26** and nut **27**. **Fig. 24**

Caution: note the side on which the connector is fitted! Tighten the nut gently until the connector swivels smoothly, but without slop, then apply a tiny drop of cyano to the outside of the nut on the point of a pin. Fit the socket-head grubscrew **28** in the pushrod connector **25** using the allen key **29**; do not tighten it at this point.
Apply activator to the recess in the elevator, and glue the prepared horn **24** in it, with the row of holes facing the hinge line. **Fig. 26**

14. Attaching the horn to the rudder
Fit the pushrod connector **25** in the outermost hole of the rudder horn **24**, and secure it with the washer **26** and nut **27**. **Fig. 26**

Caution: note the side on which the connector is fitted! Tighten the nut gently until the connector swivels smoothly, but without slop, then apply a tiny drop of cyano to the outside of the nut on the point of a pin. Fit the socket-head grubscrew **28** in the pushrod connector **25** using the allen key **29**; do not tighten it at this point.
Apply activator to the recess in the rudder, and glue the prepared horn **24** in it, with the row of holes facing the hinge line. **Fig. 26**

15. Freeing the elevator and rudder
Work the rudder and elevator to and fro repeatedly to free up the hinges; they will eventually move relatively easily. Take care not to separate the control surfaces! **Figs. 25 + 27**

16. Gluing the tail surfaces to the fuselage
Position the tailplane **7** on the fuselage "dry" (no glue) and check that it fits correctly. Ensure in particular that it is parallel to the wing saddle, and that there is no gap between the tailplane and its mount. You can check this by laying one of the spar tubes **40** on the wing saddle (e.g. secure it with masking tape). Now sight over the spar from the fuselage nose and check that the tailplane is parallel to it. When you are confident that the tailplane can be aligned correctly, glue it to the fuselage. Check that alignment is correct and there are no gaps, then leave the glue to cure. Place the fin **8** on the fuselage and tailplane "dry", and check it for fit. It is important here that the fin is a snug fit, and is at 90° to the wing saddle and the tailplane; use a setsquare or similar tool to check this.
Fig. 30

17. Retaining the elevator and rudder pushrods
Fit the front end of the steel pushrods **41** and **42** through the pushrod connectors **25**, set the servos and control surfaces to neutral (centre) and tighten the socket-head grubscrews **28**. You may find it necessary to bend the pushrods slightly to obtain correct alignment.
Figs. 31 - 32

18. Installing the undercarriage
Fit the wheels **71** on the main undercarriage unit **70**, using two collets **72** to retain each one. **Fig. 33.** Squeeze the undercarriage together gently, push it into the support **74** and allow it to snap into place. **Fig. 34**

Completing the wings
19. Installing the spar
Fit the spar tubes **40** in the spar joiner **31**, secure them with glue and trial-fit them in the wing. Apply cyano to the spar channel in the wing, then push the spars and the spar joiner quickly into place. Set the wing straight before the adhesive has a chance to cure. Sight along the wings from each tip to check for unwanted warps.
Fig. 35

Optional ailerons
If you wish to fly the model in rudder / elevator form, simply skip points **19 - 22**. The servo wells can be sealed (later) using the decals provided.

With the standard dihedral the model flies very well with rudder or ailerons as the primary turning control. It is also possible to fit ailerons to the wing at any time.

If you wish to fly the model with ailerons ("full-house" control), resume construction at this point:

20. Freeing the ailerons, installing the aileron servos
Cut a slot at both ends of the ailerons, which are attached to the wing **6**. Work the ailerons to and fro repeatedly to free up the hinges; they will eventually move relatively easily. Take care not to separate the control surfaces!
Fig. 36

21. Installing the aileron servos
Set the servos to neutral from the transmitter. Fit the output arms on the servos so that the arms are at 90° to the servo case - 1 x left, 1 x right.
Check that the servos fit snugly in the recesses in the wings **6**. You may need to make minor adjustments to suit the servo type you are using. Apply a drop of hot-melt glue to the slots in the wing for the servo mountings lugs, and press the servos into the recess immediately. Apply another drop of glue if necessary.
Fig. 37

22. Deploying the aileron servo leads
Deploy the servo leads along the wing towards the centre section. The lead must fit in the front edge of the spar channel and run perfectly straight, standing "on edge". The leads should project by about **120 mm** at the wing root, so that you can comfortably connect the plugs to the receiver when the model is assembled. You may need to extend the standard servo leads. Secure the leads at the centre of the wings with a drop of hot-melt glue.

23. Attaching the aileron horns
Fit the pushrod connectors **25** in the outermost hole of the aileron horns **24**. Secure the connectors using the washers **26** and nuts **27**. **Caution**: make a handed pair: 1 x left, 1 x right. Tighten the nuts gently until the connectors swivel smoothly, but without slop, then apply a tiny drop of cyano to the outside of the nuts on the point of a pin. Fit the socket-head grubscrews **28** in the pushrod connectors **25** using the allen key **29**; do not tighten them at this point.
Apply activator to the recesses in the ailerons and glue the horns **24** in them with the row of holes facing the hinge line.
Fig. 38

24. Installing the aileron pushrods
Connect the pre-formed end of the steel pushrods **30** to the innermost hole of the servo output arm, and fit the plain end through the pushrod connector **25** on the aileron horn. Set the aileron and servo to neutral (centre), and tighten the grubscrew **28** to secure the pushrod**.**
Fig. 39

25. Attach the wing to the fuselage using the screw **32.**
Fig. 40

26. Installing the radio control system components
The next step is to install the remaining radio components and the flight battery in the cabin area. Keep one eye on the recommended Centre of Gravity position when positioning these items; see **Fig. 43**.
You can correct the CG position by adjusting the location of the flight battery.

Pieces of Velcro tape **20 + 21** are supplied in the kit for securing these components. Please note that the adhesive on the tape is not very strong, and we recommend that you stick the tape in the fuselage with cyano for additional security.

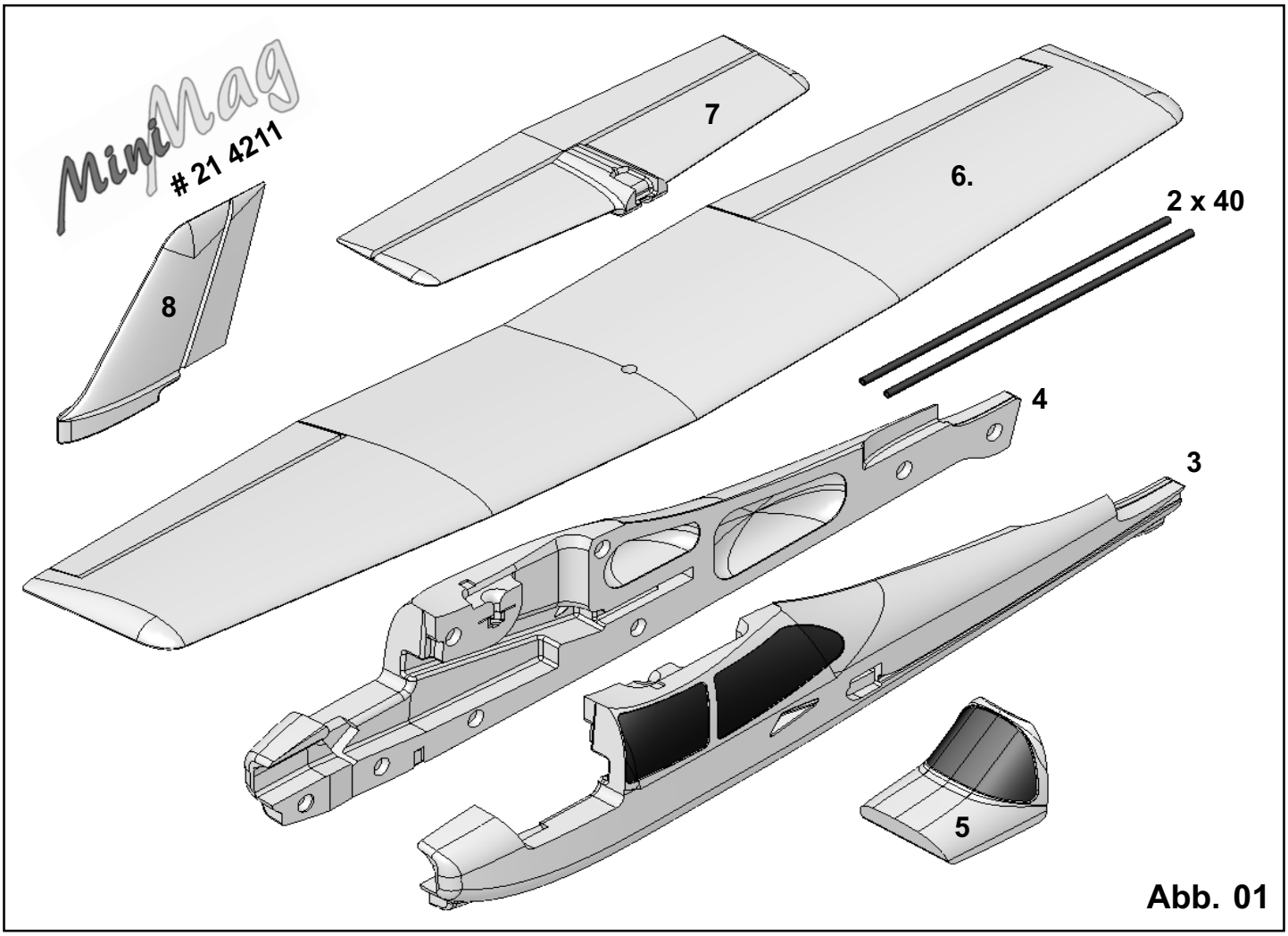
Fit the receiver behind the wing screw, standing upright. Run the aerial wire out of the fuselage and tape it in place. The speed controller should be positioned immediately aft of the motor.

The motor supplied in the kit features internal suppressors, and these are adequate if you are using a MULTIcont X-16 speed controller, # 7 2271.

If you prefer to use a different controller, it is in your own interests to fit additional suppression measures to the electric motor. A suitable suppressor set is available under # 8 5020. Solder one 47 nF capacitor between one motor terminal and the motor can, and a second one between the other terminal and the can. The third 47 nF capacitor should be soldered across the terminals to form a bridge.

Installing the propeller
The next step is the initial test-run of the motor, but first the propeller must be fitted. The procedure for this varies according to the power system you have installed. However, please be sure it is firmly located in every case. In the standard version the spinner and propeller should be secured with a drop of adhesive and glued to the motor shaft. Use 5-minute epoxy with a Guenter propeller, and cyano with an MPX prop.

Once the wiring is complete, you are ready to carry out the first test-run.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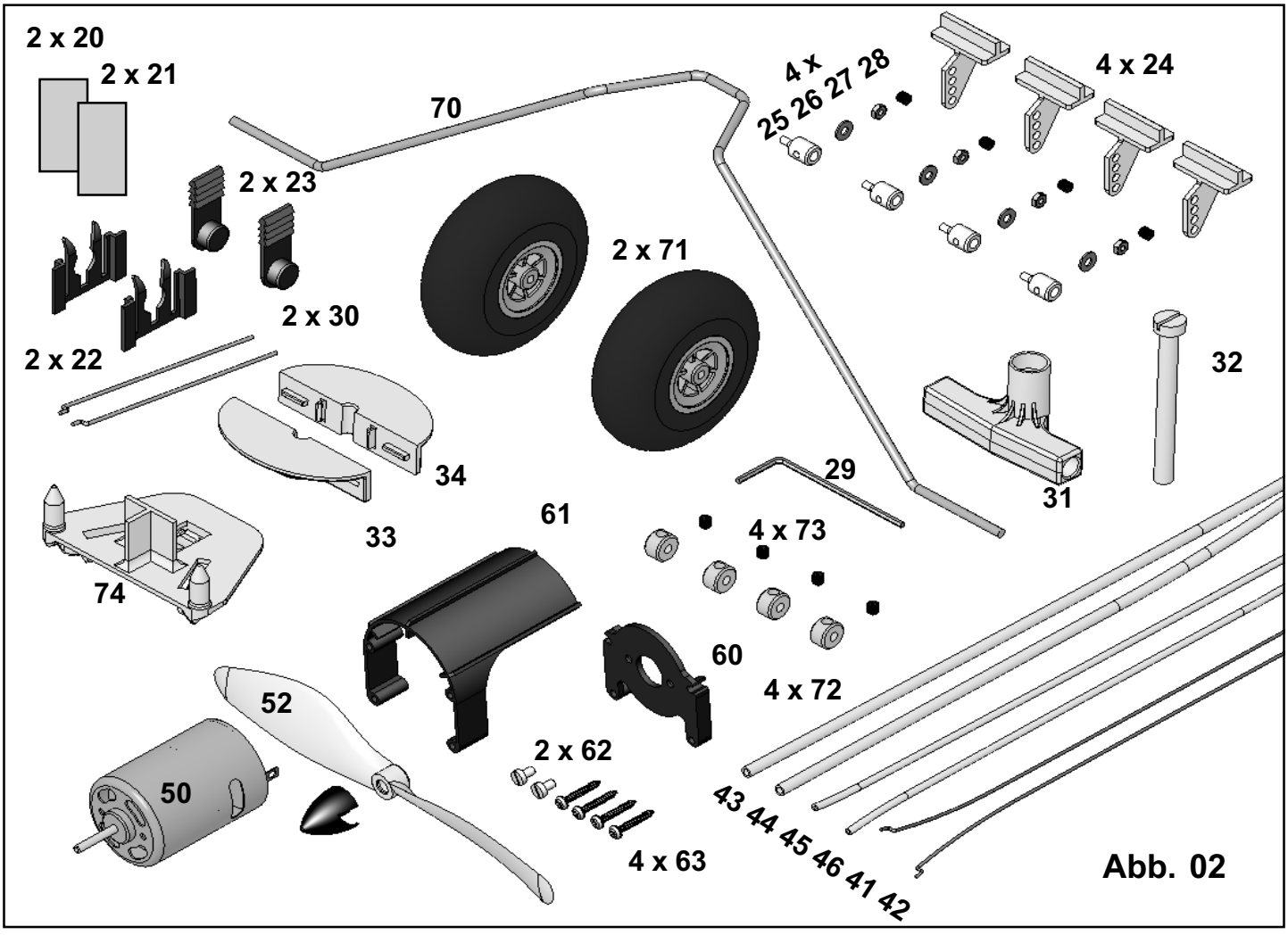
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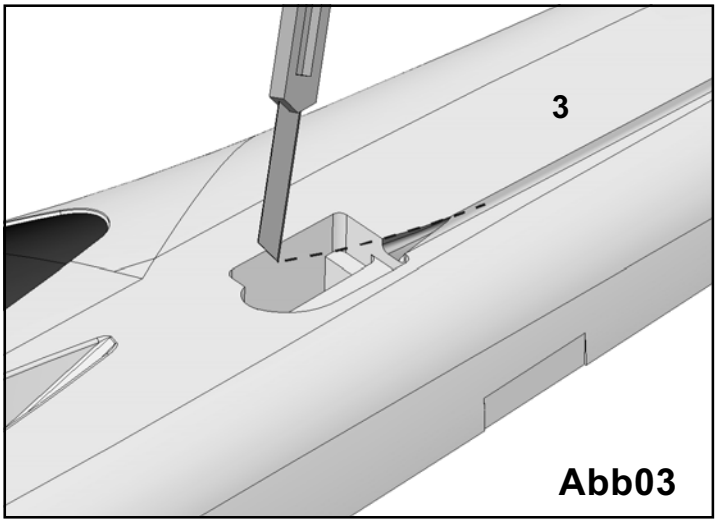
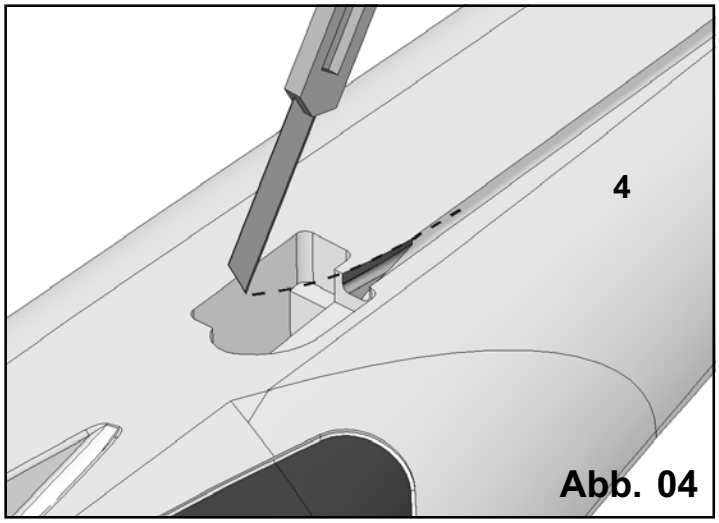
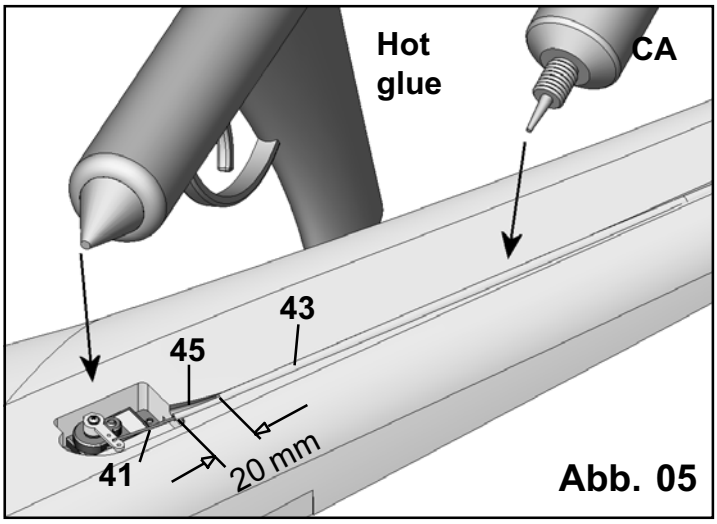
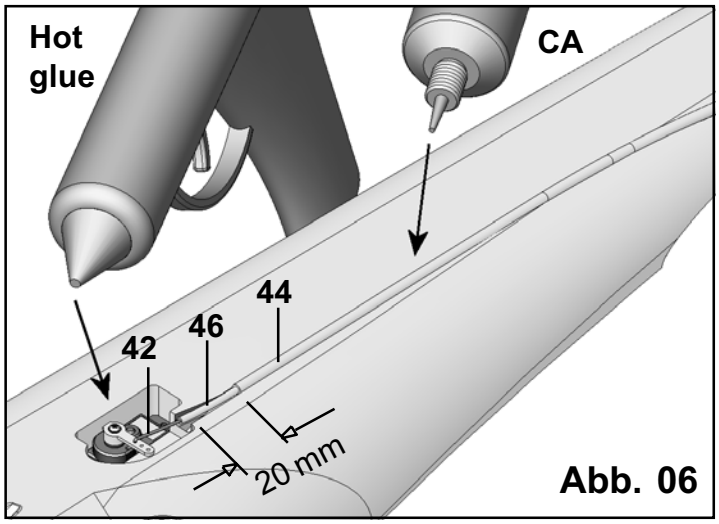
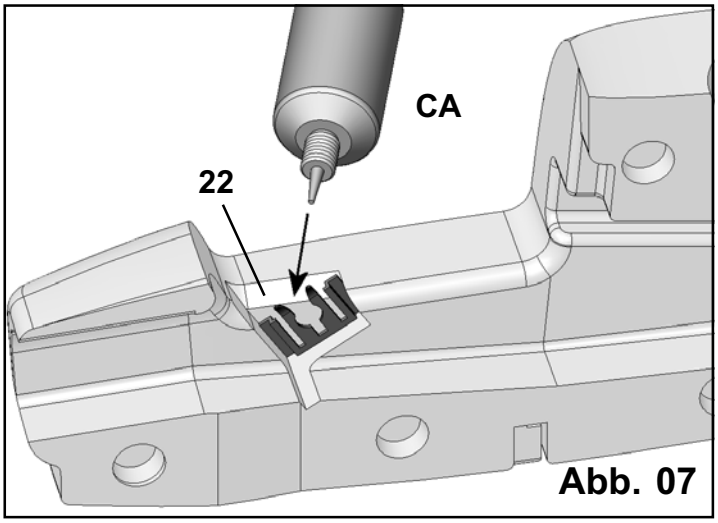
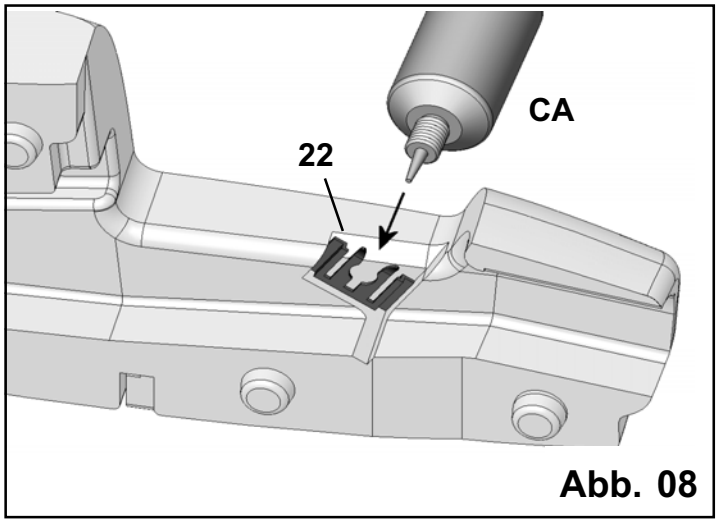


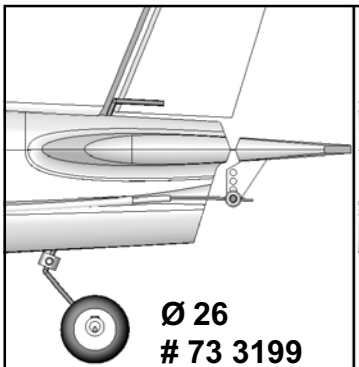






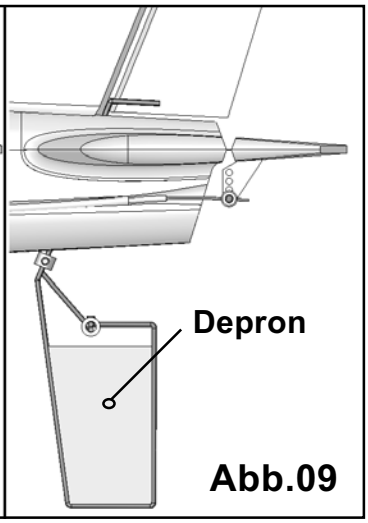


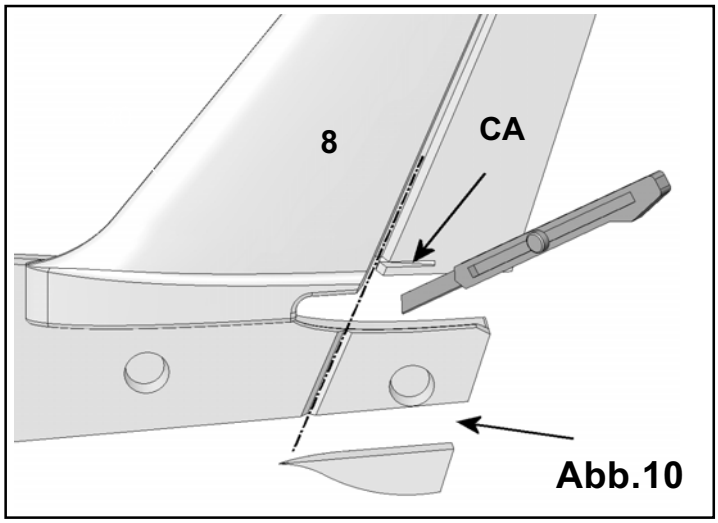


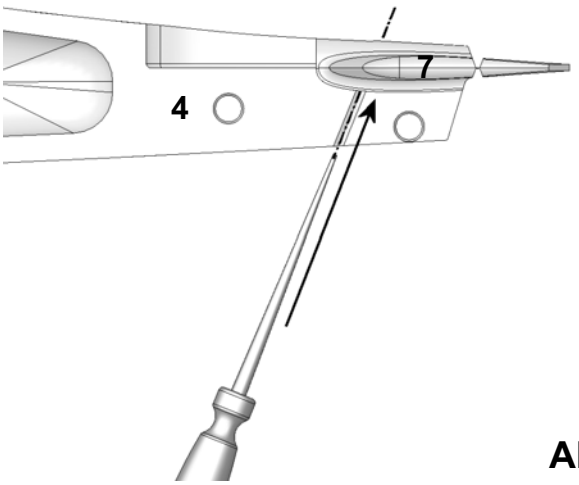


Heckrad=Option. Die Teile liegen dem BK nicht bei!

Tailwheel = option. Parts not included in the kit







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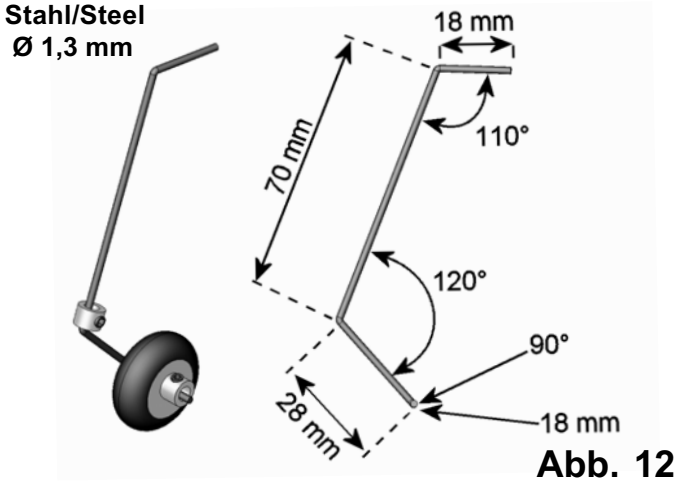

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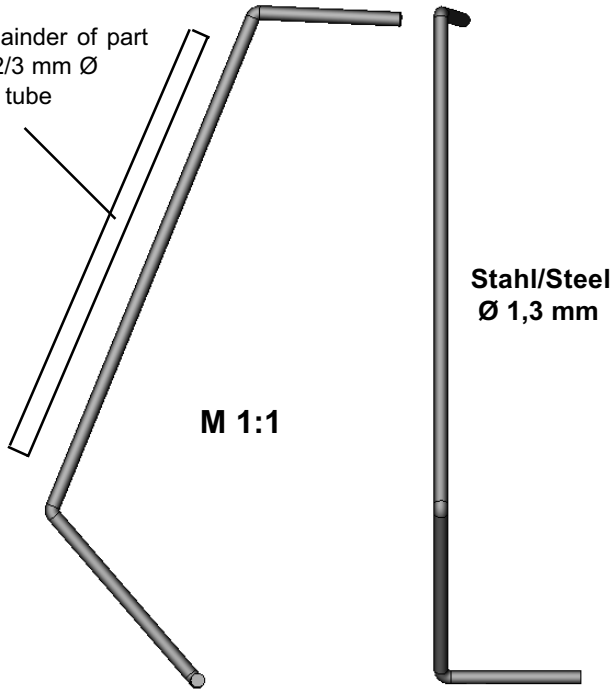
Rest von Teil 44
PVC Rohr 2/3 mm

Remainder of part
44; 2/3 mm Ø
PVC tube



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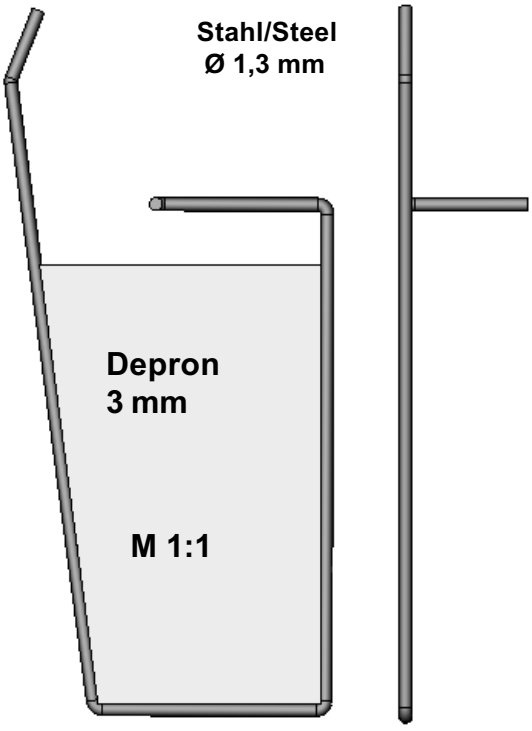

Die Teile liegen dem BK nicht bei!

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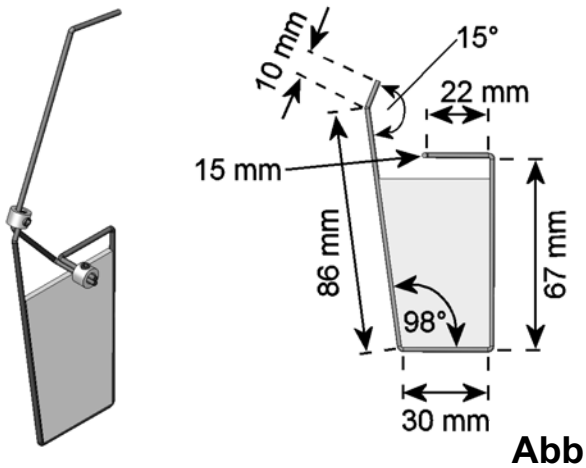


Abb. 13

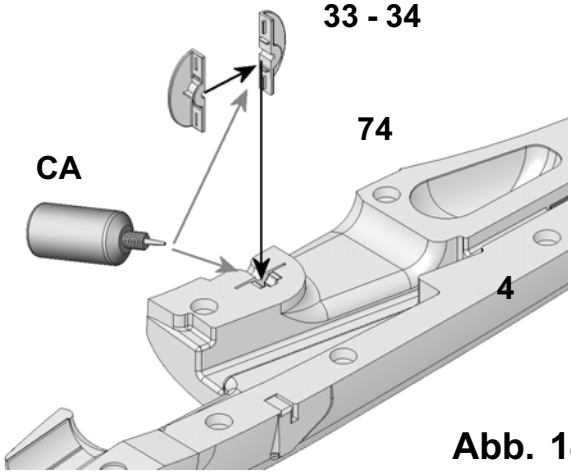


Abb. 14

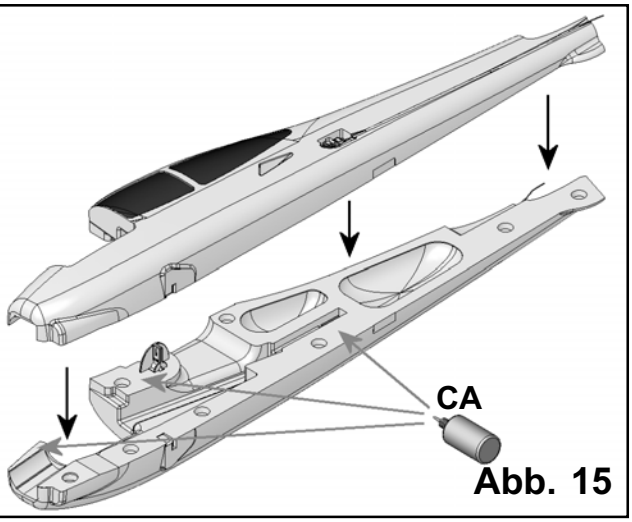
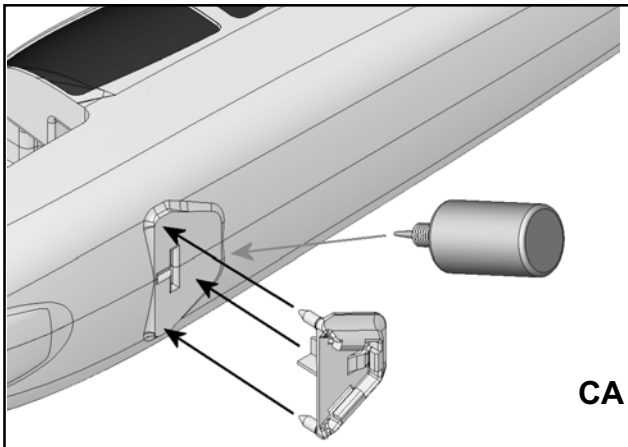


Abb. 15



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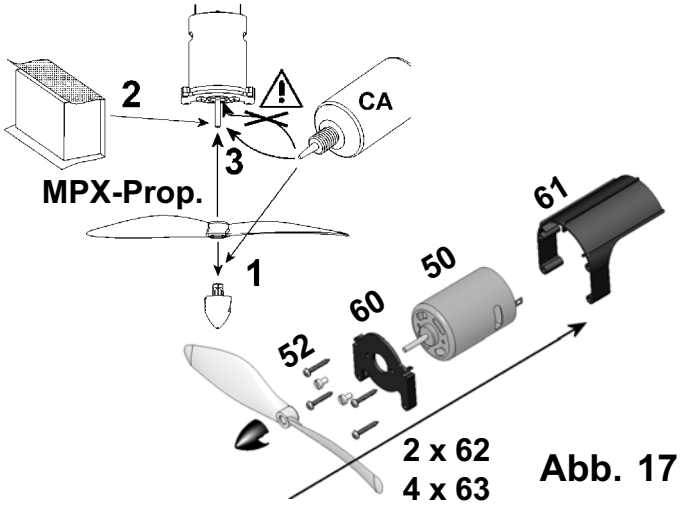


Abb. 17

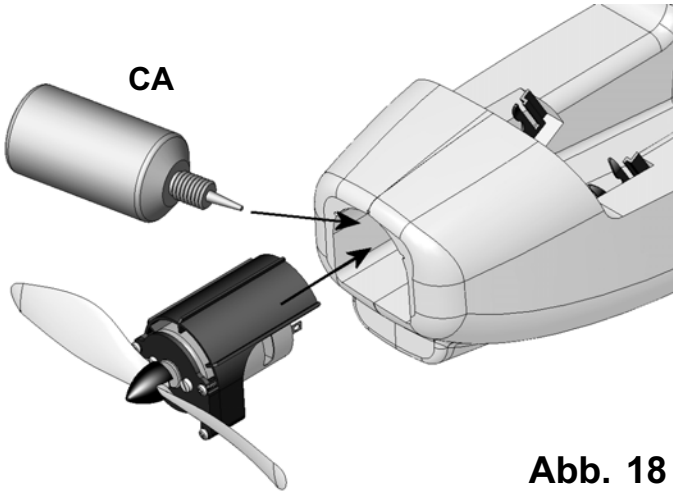


Abb. 18

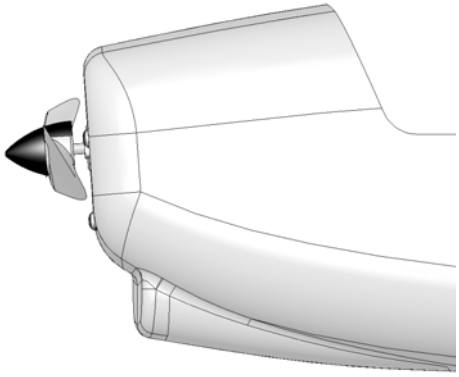
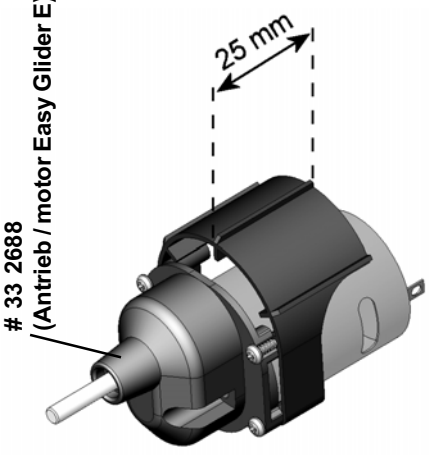


Abb. 19



Mitnehmer
für Ø 3,5 mm /
3.5 mm Ø driver
 # 33 2310

passende Luft-
schraube / propeller
8 x 3,8“
 # 73 3139

Abb. 20

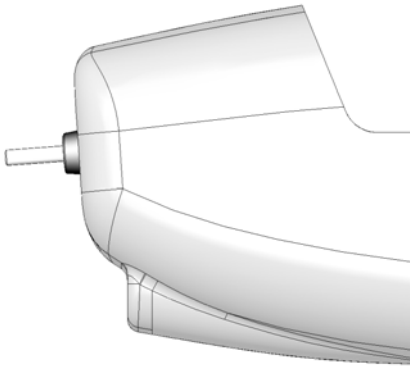


Abb.21

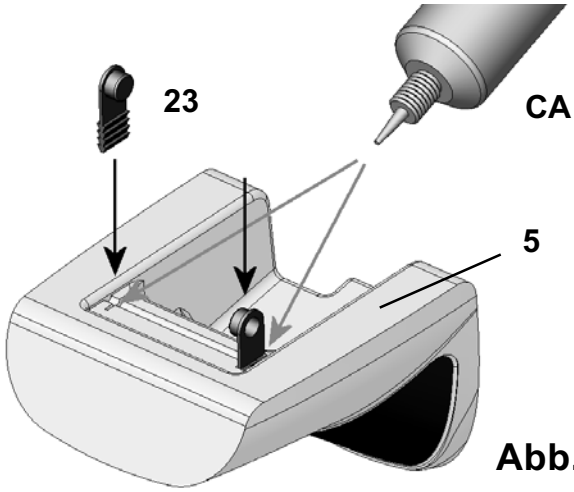


Abb.22

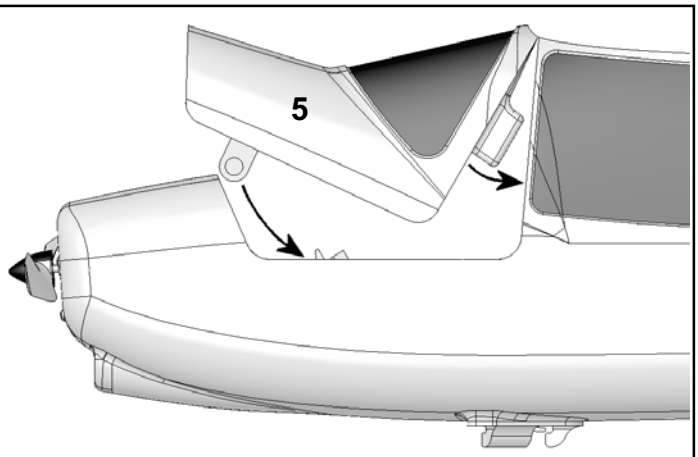


Abb. 23

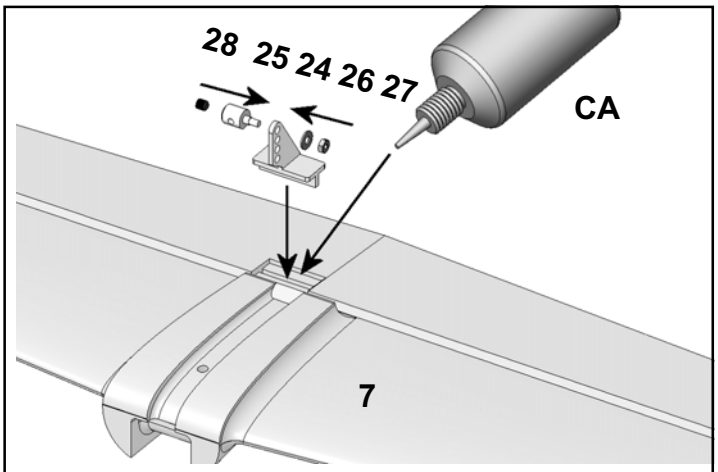
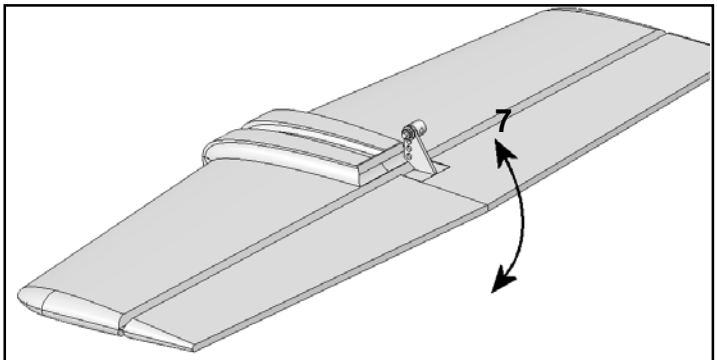


Abb.24



gängig machen!

Move to and fro to ease hinge

Abb. 25

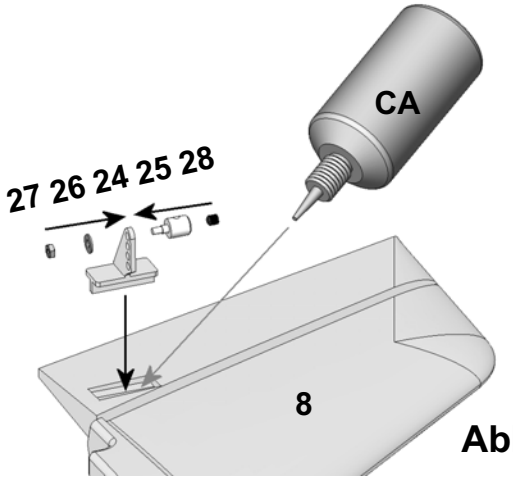
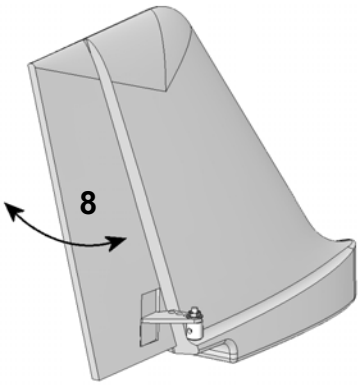


Abb. 26



gängig machen!

Move to and fro to ease hinge

Abb. 27

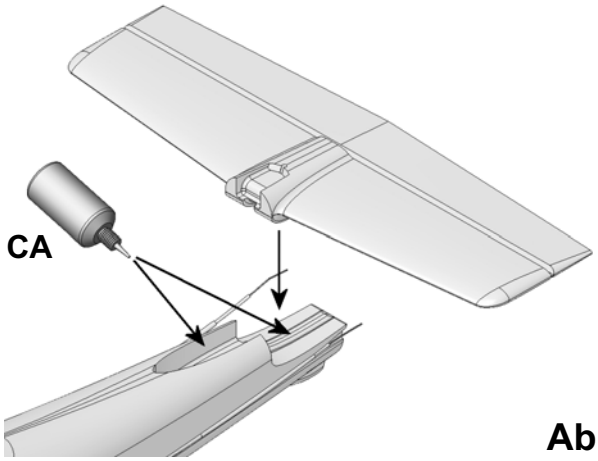


Abb. 28

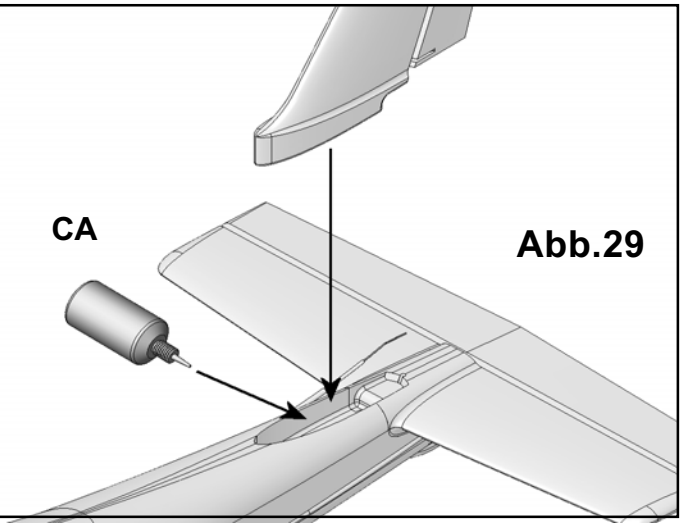


Abb.29

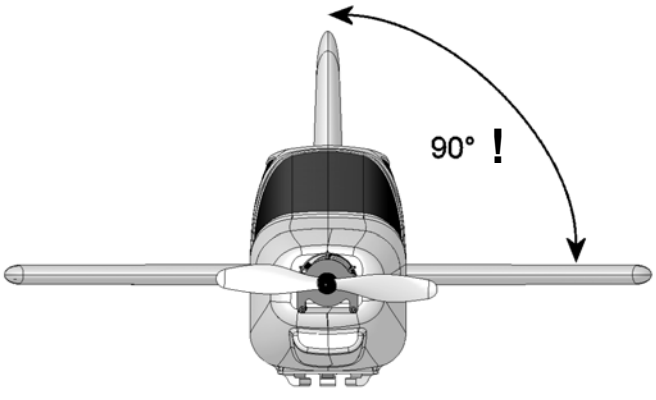


Abb.30

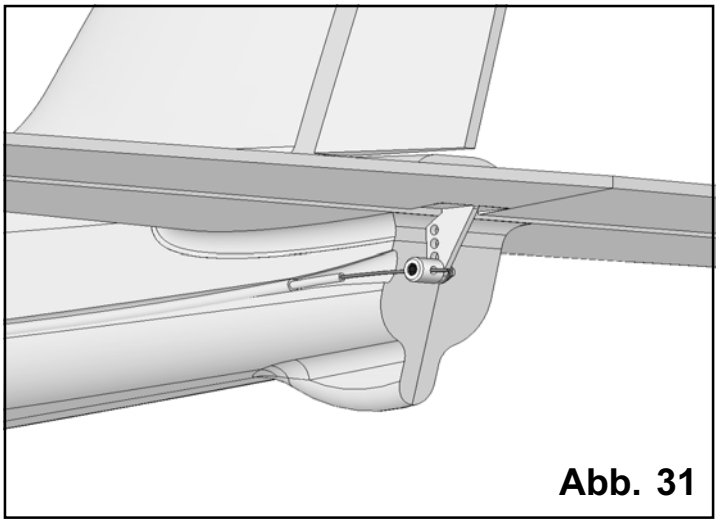


Abb. 31

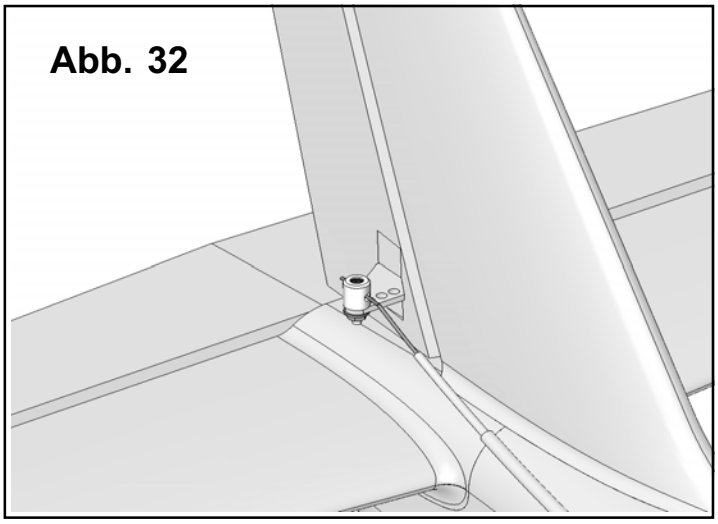


Abb. 32

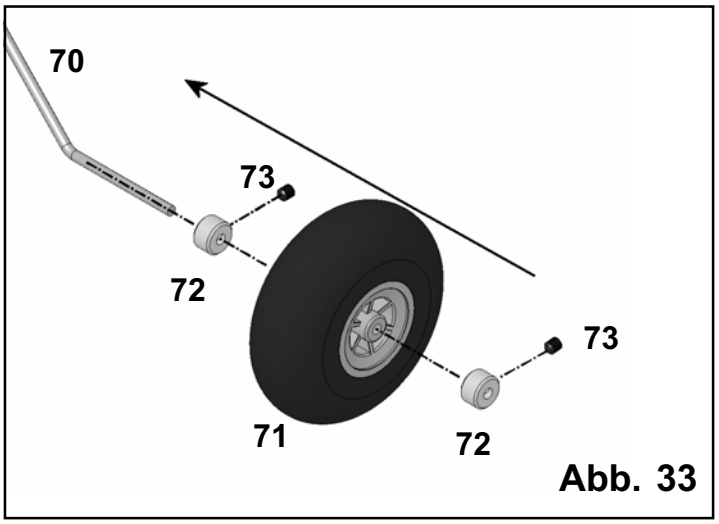


Abb. 33

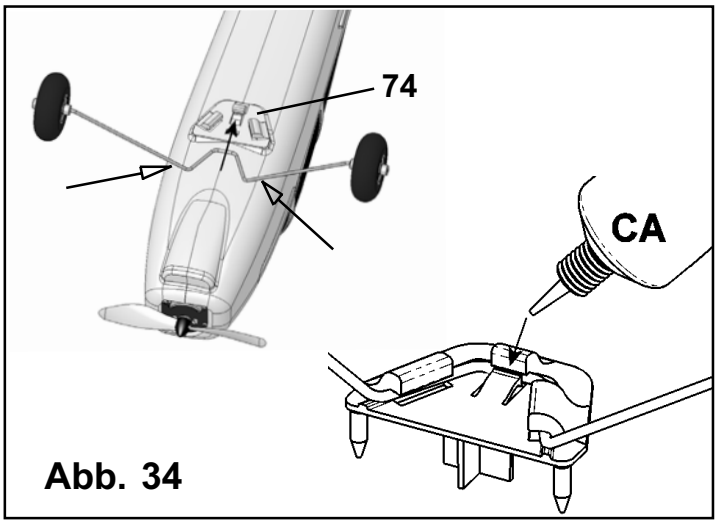


Abb. 34

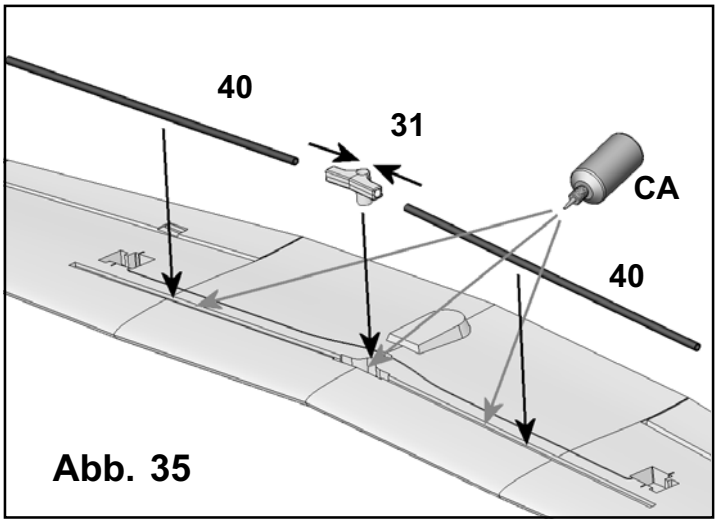


Abb. 35

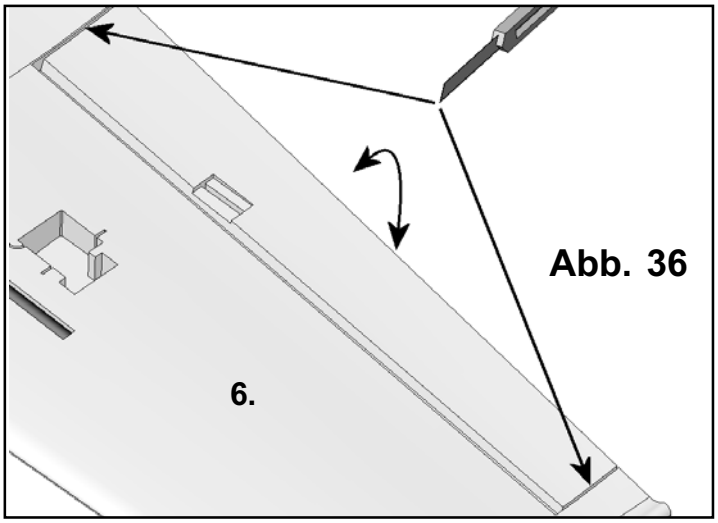


Abb. 36

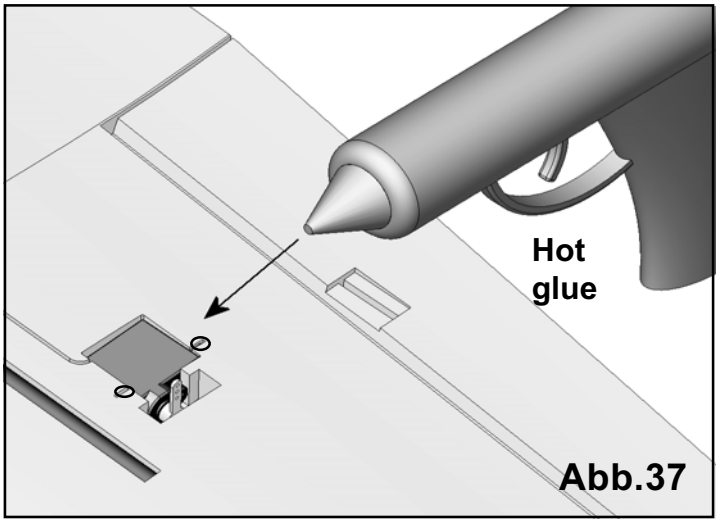


Abb.37

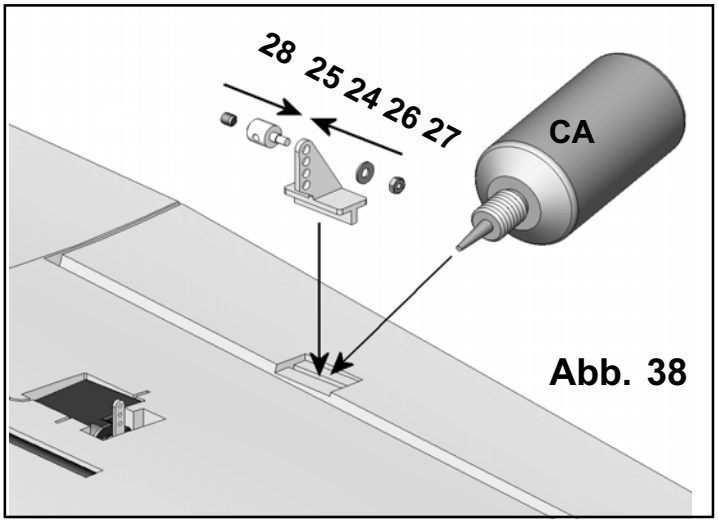


Abb. 38

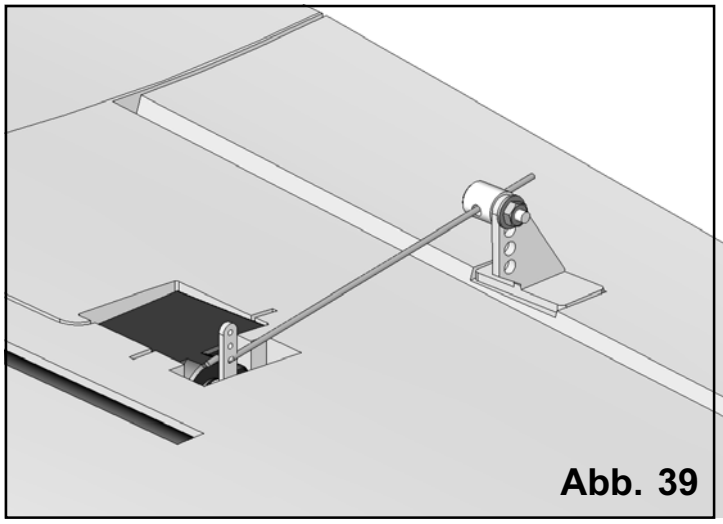


Abb. 39

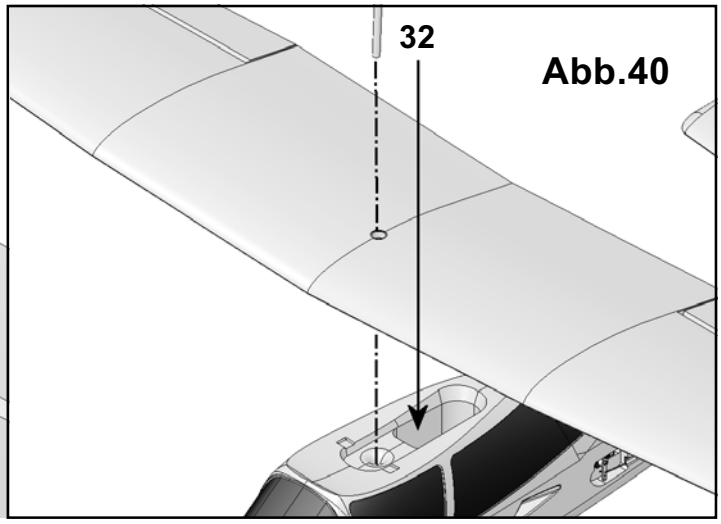


Abb.40

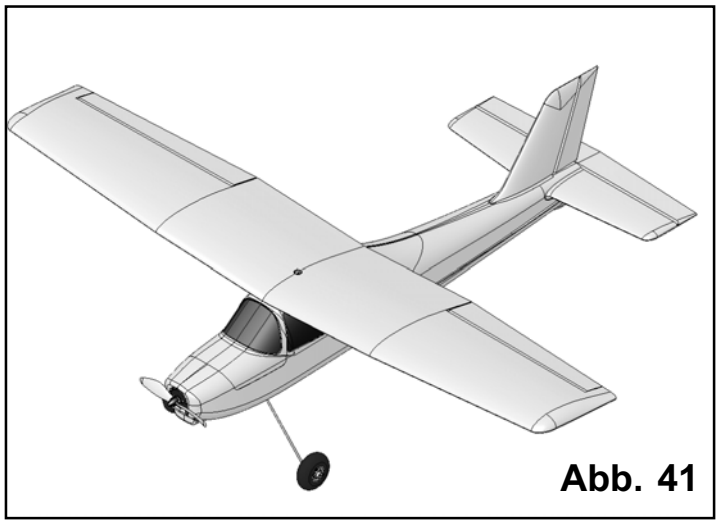
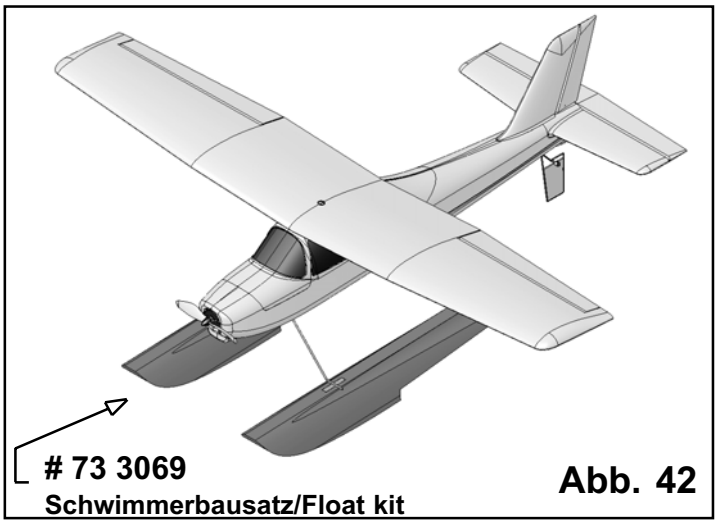


Abb. 41



73 3069
Schwimmerbausatz/Float kit

Abb. 42

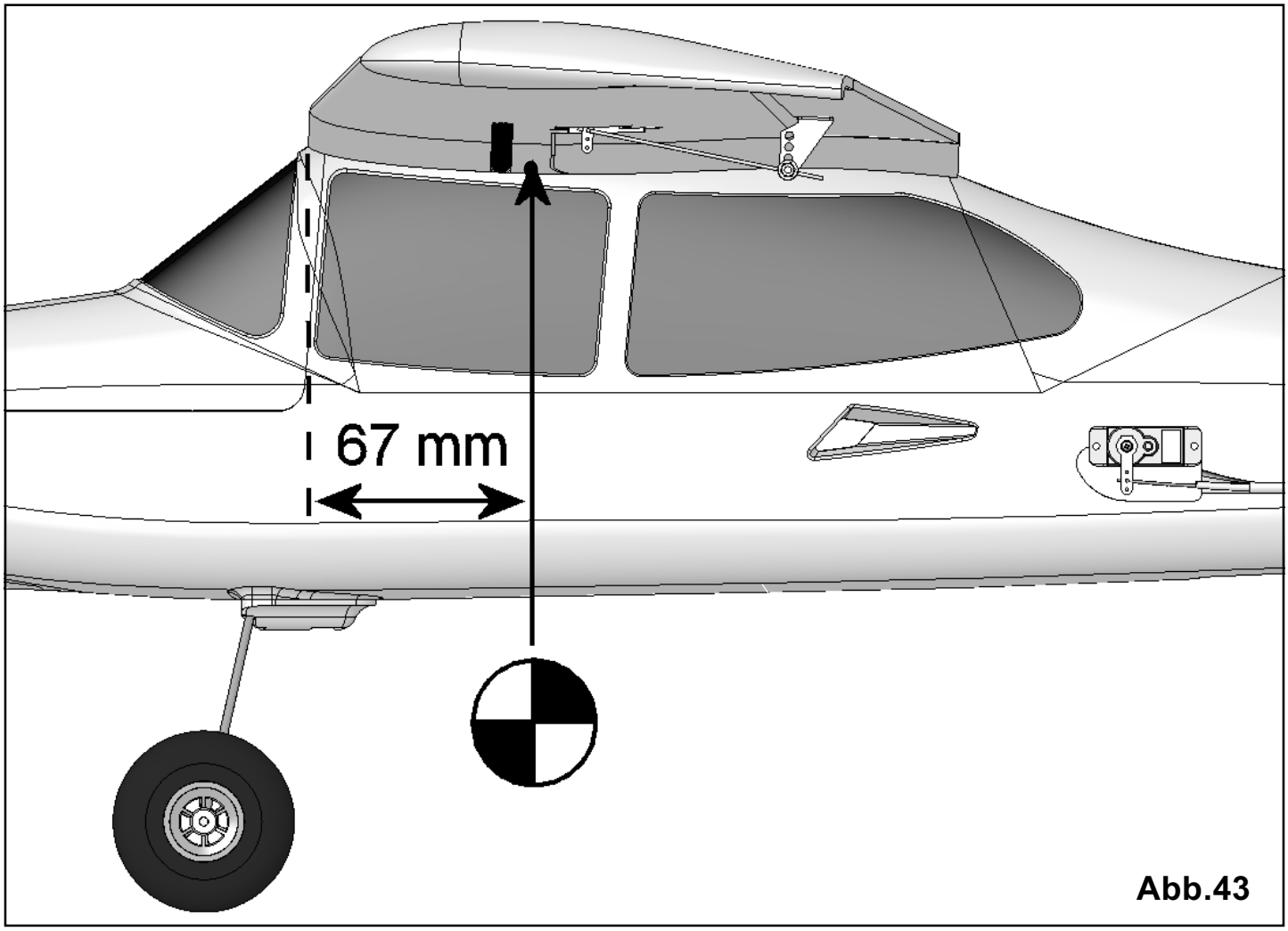


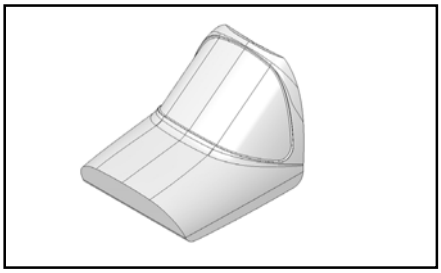
Abb.43

Ersatzteile
Replacement parts
Pièces de rechanges
Parti di ricambio
Repuestos

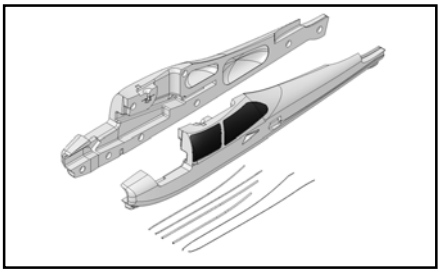
MiniMag

(bitte bei Ihrem Fachhändler bestellen)
(please order from your model shop)
(S.V.P. à ne commander que chez votre revendeur)
(da ordinare presso il rivenditore)
(por favor, diríjase a su distribuidor)

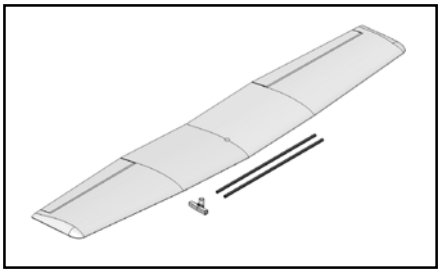
 # 22 4176
Kabinenhaube
Canopy
Verrière
Capottina
Cabina



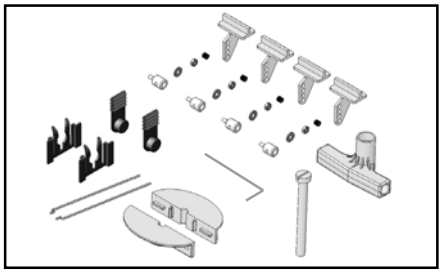
 # 22 4175
Rumpfhälften + Bowdenzüge
Fuselage shells + snakes
Moitié de fuselage + tringlerie
Semigusci fusoliera + bowden
Fuselaje + trans. bowden



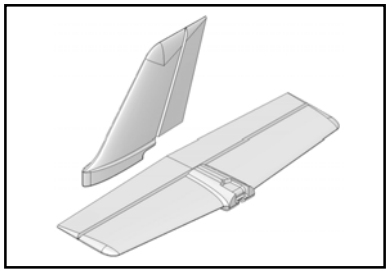
 # 22 4177
Tragfläche
panel
Aile
Ali
Alas



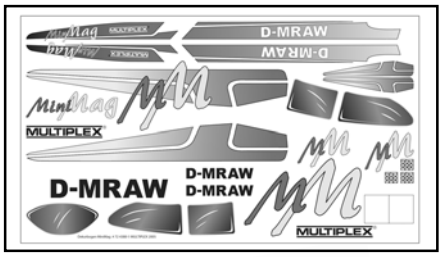
 # 22 4179
Kleinteilesatz
Small items set
Petit nécessaire
Minuteria
Piezas pequeñas



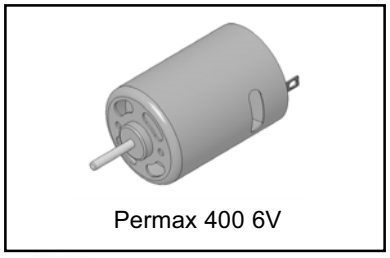
 # 22 4178
Leitwerkssatz
Tail set
Kit de gouvernes
Piani di coda
Timones



 # 72 4388
Dekorbogen
Decal sheet
Planche de décoration
Decals
Lámina decorativa

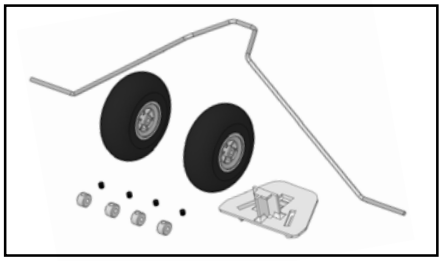


 # 33 2545
Motor
Motor
Moteur
Motore
Motor

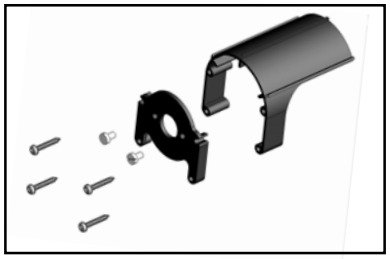


Permax 400 6V

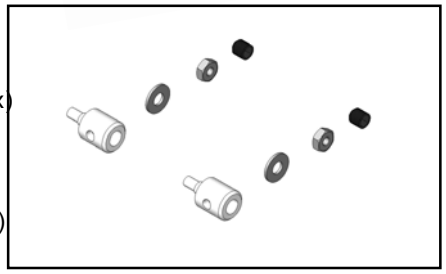
 # 22 4180
Fahrwerkssatz
Undercarriage compon.
Train d'atterrissage
Parti per carrello
Kit del tren de aterrizaje



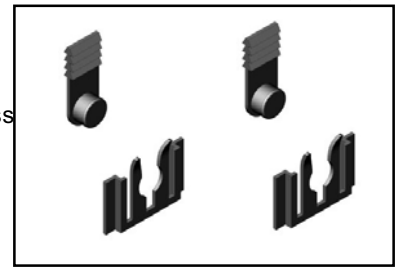
 # 33 2699
Motorträger
Motor mount
Support moteur
Supporto motore
Soporte del motor



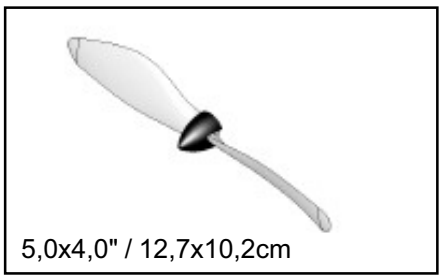
 # 70 3455
Gestängeanschluss (2x)
Pushrod connector (2x)
Element de fixitation (2x)
Raccordo rinvii (2x)
Conexión del verillaje(2x)



 # 72 5136
Canopy-Lock
Kabinenhaubenverschluss
Fermeture de verrière
Chiusura capottina
Cierre de cabina

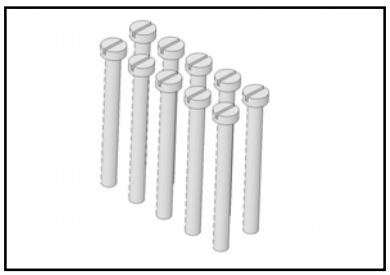


 # 72 4279 / # 72 4293
Luftschraube
Propeller
Hélice
Elica
Hélice



5,0x4,0" / 12,7x10,2cm

 # 71 3340
Schraube M5x50mm (10x)
Screw M5x50mm (10x)
Vis M5x50mm (10x)
Vite M5x50mm (10x)
Tornillo M5x50mm (10x)



Do not connect the flight battery to the speed controller until you have switched on the transmitter and move the throttle stick or switch to the "Motor Stopped" position.
Switch on the transmitter, connect the flight battery to the speed controller, and the controller to the receiver. With this model you must use a controller with what is known as a BEC circuit (receiver power supply from the flight battery).
Now switch the motor on briefly, and check once more the direction of rotation of the propeller. Hold the model firmly when you run the motor, and remove any loose lightweight objects from the area behind the model before the propeller does the job for you.
Caution: even small motors and propellers represent a distinct injury hazard!

27. Setting the control surface travels
It is important to set the control surface travels correctly, as these settings have a crucial influence on the model's overall control response. In all cases the travels are measured at the point of maximum chord (width of control surface.

Elevator

up	- stick back	- approx. + 11 mm
down	- stick forward	- approx. - 11 mm

Rudder

left and right each way	- approx. 6-10 mm

Ailerons

up	- approx. + 7 mm
down	- approx. - 3 mm

MagicMixer #1 (optional) **# 7 3000**
The MagicMixer #1 permits the use of a simple radio control transmitter without mixer functions. It is adequate for:

MINI MAG 3-channel RC transmitter

Without the MagicMixer #1 you will need at least a four-channel computer transmitter with mixer functions.

Using this module the Mini Mag can be flown even with a transmitter such as the Ranger III, as supplied with the EasyStar and SpaceScooter RTF models.
It provides a means of controlling two aileron servos and the rudder from a single channel (right / left output) at the receiver.

The servos, and therefore the control surface travels, are automatically actuated with the correct deflections. Using the MagicMixer #1 the degree to which the rudder follows the ailerons ("combi-switch" / CAR function) and the aileron differential are fixed, i.e. they cannot be altered.

Aileron differential means that the up-aileron travel is greater than the down-aileron travel. This helps to prevent the model swinging away from the turn (adverse yaw) when ailerons are applied.

If you are using the MagicMixer #1 your transmitter must offer at least the following channels:

Channel 1:	Ailerons, coupled rudder	(3 servos)
Channel 2:	Elevator	(1 servo)
Channel 3:	Throttle	(1 servo)

Connect the aileron servo leads as described in the **"MagicMixer #1" instructions**. Take care to maintain correct polarity when making these connections: the signal pin is indicated on the label of the MagicMixer with the square signal symbol. The signal wire in the servo lead is generally yellow or orange.

Connections at the MagicMixer #1:
r/l = to receiver, right / left output
AR = to right aileron servo
AL = to left aileron servo
R = to rudder servo

If necessary, set the correct direction of servo travel using the servo reverse facility on your transmitter.

Y-lead for the aileron servos (optional) **# 8 5030**
The Y-lead permits the use of a simple four-channel radio control transmitter, i.e. without mixer functions. The two aileron servos are actuated simultaneously by a single receiver servo output.

Please note: in this case the differential aileron movement must be obtained by mechanical means. This is achieved by offsetting the servo output arms forward by two splines. This must be done before you install the servos. The rudder is controlled via a separate channel with this arrangement.

Computer radio control transmitter
If you have this type of transmitter you need neither a MagicMixer #1 nor a Y-lead.

The transmitter must feature the following adjustment facilities:
- Aileron differential mixer
- Servo reverse
- Servo travel adjustment
- Optional combi-switch (coupled rudder / ailerons)

Note: when you apply a right-aileron command at the transmitter, the right-hand aileron (as seen from the tail) must deflect up.
If you find that you cannot set the correct control surface travels with your radio control system, you will need to change the linkage hole to which the pushrod is connected.

28. Gilding the lily
The kit includes a multi-colour decal sheet. Cut out the individual name placards and emblems and apply them to the model, either following our scheme (kit box illustration) or using your own arrangement. If you have built the rudder / elevator version of the model, you will find decals on the sheet designed for covering the servo recesses in the wing.

29. Balancing
If your ***Mini Mag*** is to fly safely and stably it must balance at the correct point - just like every other aircraft. Assemble your model completely, ready to fly, and install the flight battery.

The **Centre of Gravity** should be at a point **67 mm** aft of the leading edge of the wing, measured where the wing meets the fuselage. You will find markings moulded into the underside of the wing at this point.
Support the model on your fingertips at the marked point, and it should balance level. If necessary, adjust the position of the flight battery until this is the case. Once the correct position is found, mark it inside the battery box to ensure that the battery is always replaced in exactly the same location. **Fig. 43**

30. Preparing for the first flight
Wait for a day with as little breeze as possible for the first flight. The evening hours often provide the best conditions.

Be sure to carry out a range check before the first flight!

The transmitter battery and flight pack must be fully charged according to the instructions. Ensure that the channel you are using is not already in use before you switch on the transmitter.
Collapse the transmitter aerial, and ask a friend to walk away from you holding the transmitter.
As he walks away your friend should constantly operate one control function while you watch the model's servos. The servo not being operated should stay motionless up to a range of around 60 m, and the other servo should follow the transmitter stick movements smoothly and immediately. This test only provides meaningful results if the radio band is "clean" (not suffering interference), and if no other radio control transmitters are switched on, even if they are on different channels. If successful, repeat the check **with the motor running**. The effective range should not be significantly reduced when the motor is running.

If you are not sure about anything, do not fly the model! If you cannot eliminate the problem send the whole radio control system (including battery, switch harness, servos) to the manufacturer's service department for checking.

The first flight ....

Do not test-glide this model!
The model is designed for hand-launching - always exactly into wind.
We recommend that you ask an experienced modeller to help you during the first flight.
Allow the model to climb to a safe altitude, then adjust the trims on the transmitter so that the model flies straight ahead without any help from you.

At a safe height switch off the motor and make yourself familiar with the model's control response on the glide. Carry out a dummy landing approach at a good height, so that you will feel confident about the real landing when the flight pack is flat.

Don't attempt tightly banked turns close to the ground at first, and especially not on the landing approach.
It is always better to land safely some distance away, and have to walk to collect the model, than to risk damaging it by dragging it close to your feet.

31. Safety
Safety is the First Commandment when flying any model aircraft. Third party insurance should be considered a basic essential. If you join a model club suitable cover will usually be available through the organisation. It is your personal responsibility to ensure that your insurance is adequate (i.e. that its cover includes powered model aircraft).
Make it your job to keep your models and your radio control system in perfect order at all times. Check the correct charging procedure for the rechargeable batteries used in your RC set. Make use of all sensible safety systems and precautions which are advised for your system. An excellent source of practical accessories is the MULTIPLEX main catalogue, as our products are designed and manufactured exclusively by practising modellers for other practising modellers.
Always fly with a responsible attitude. You may think that flying low over other people's heads is proof of your piloting skill; others know better. The real expert does not need to prove himself in such childish ways. It is in all our interests that you let other pilots know that this is also what you think. Always fly in such a way that you do not endanger yourself or others. Bear in mind that even the best RC system in the world is subject to outside interference. No matter how many years of accident-free flying you have under your belt, you have no idea what will happen in the next minute.

We - the MULTIPLEX team - hope you have many hours of pleasure building and flying your new model.

Klaus Michler
Product development
MULTIPLEX Modellsport GmbH & Co. KG

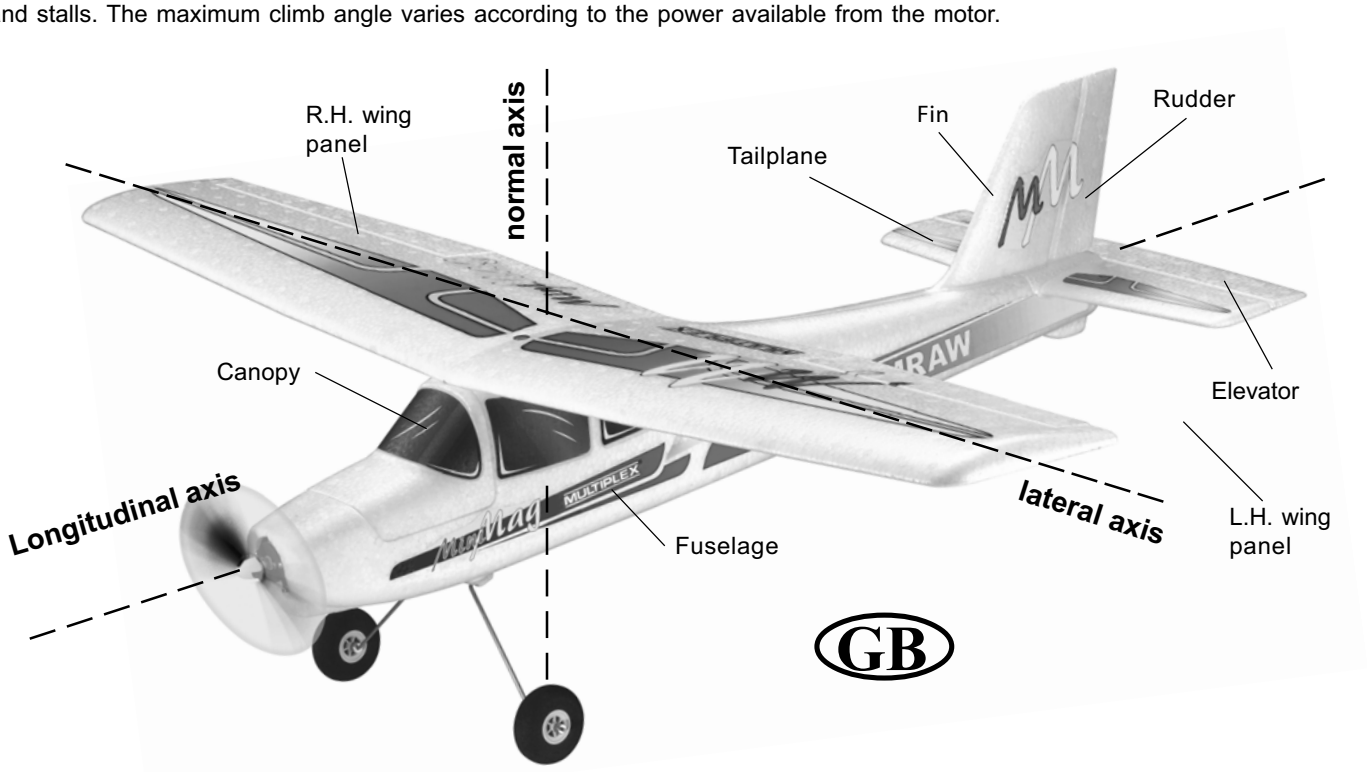
Parts List **Mini Mag kit** **# 21 4211**

Part	No. off	Description	Material	Dimensions
1	1	Building instructions	Paper	A4
2	1	Decal sheet	Printed adhesive film	400 x 700 mm
3	1	Left-hand fuselage shell	Moulded Elapor foam	Ready made
4	1	Right-hand fuselage shell	Moulded Elapor foam	Ready made
5	1	Canopy	Moulded Elapor foam	Ready made
6	1	Wing	Moulded Elapor foam	Ready made
7	1	Tailplane	Moulded Elapor foam	Ready made
8	1	Fin	Moulded Elapor foam	Ready made
Small parts set				
20	2	Velcro tape, hook	Plastic	25 x 60 mm
21	2	Velcro tape, loop	Plastic	25 x 60 mm
22	2	Canopy latch clip	Inj. moulded plastic	Ready made
23	2	Canopy latch lug	Inj. moulded plastic	Ready made
24	4	Glue-fitting horn	Inj. moulded plastic	Ready made
25	4	Pushrod connector	Metal	Ready made, 6 mm Ø
26	4	Washer	Metal	M2
27	4	Nut	Metal	M2
28	4	Socket-head grubscrew	Metal	M3 x 3 mm
29	2	Allen key	Metal	1.5 mm A/F
30	2	Aileron pushrod, one Z-bend	Metal	1 Ø x 70
31	1	Spar joiner	Inj. moulded plastic	Ready made
32	1	Screw	Plastic	M5 x 50 mm
33	1	Wing bolt support A	Inj. moulded plastic	Ready made, M5
34	1	Wing bolt support B	Inj. moulded plastic	Ready made, M5
Wire set				
40	2	Spar tube	GRP tube	6 / 4 Ø x 300 mm
41	1	Steel elevator pushrod, one Z-bend	Metal	0.8 Ø x 355 mm
42	2	Steel rudder pushrod, one Z-bend	Metal	0.8 Ø x 325 mm
43	1	Elevator snake outer sleeve	Plastic	3 / 2 Ø x 275 mm
44	1	Rudder snake outer sleeve	Plastic	3 / 2 Ø x 225 mm (275 mm*)
45	1	Elevator snake inner tube	Plastic	2 / 1 Ø x 300 mm
46	1	Rudder snake inner tube	Plastic	2 / 1 Ø x 275 mm (300 mm*)
		*supplied length -> cut to correct length		
Power set				
60-63	1	Motor mount, Permax 400 (1 off)	See below	
50	1	Motor	Permax 400 6 V	Ready made
52	1	Propeller	Plastic	125 x 110 mm
Permax 400 motor mount (1 x), two-part incl. screws				
60	1	Motor bulkhead	Inj. moulded plastic	Ready made
61	1	Motor bulkhead holder	Inj. moulded plastic	Ready made
62	2	Screw	Metal	M2.5 x 4 mm
63	4	Screw	Metal	2.2 x 13 mm
Undercarriage set				
70	1	Main undercarriage unit	Metal	2.5 Ø, ready made
71	2	Lightweight wheel	Plastic	53 Ø, 2.5 mm bore
72	4	Collet	Metal	2.7 / 7 Ø x 5 mm
73	4	Socket-head grubscrew	Metal	M3 x 3 mm
74	1	Undercarriage support	Plastic	Ready made
CD instructions / movie				
80	1	CD instructions / movie		Ready made

Basic information relating to model aircraft

Any aircraft, whether full-size or model, can be controlled around the three primary axes: vertical (yaw), lateral (pitch) and longitudinal (roll).

When you operate the elevator, the model's attitude alters around the lateral axis. If you apply a rudder command, the model swings around the vertical axis. If you move the aileron stick, the model rolls around its longitudinal axis. As our EasyStar has considerable wing dihedral, ailerons are not required for roll control. In this case the rudder is used both to turn the model around the vertical axis, and also to roll it (longitudinal axis). External influences such as air turbulence may cause the model to deviate from its intended flight path, and when this happens the pilot must control the model in such a way that it returns to the required direction. The basic method of controlling the model's height (altitude) is to vary motor speed (motor and propeller). The rotational speed of the motor is usually altered by means of a speed controller. Applying up-elevator also causes the model to gain height, but at the same time it loses speed, and this can only be continued until the model reaches its minimum airspeed and stalls. The maximum climb angle varies according to the power available from the motor.



Wing section

The wing features a cambered airfoil section over which the air flows when the model is flying. In a given period of time the air flowing over the top surface of the wing has to cover a greater distance than the air flowing under it. This causes a reduction in pressure on the top surface, which in turn creates a lifting force which keeps the aircraft in the air. **Fig. A**

Centre of Gravity (CG)

To achieve stable flying characteristics your model aircraft must balance at a particular point, just like any other aircraft. It is absolutely essential to check and set the correct CG position before flying the model for the first time.

The CG position is stated as a distance which is measured aft from the wing root leading edge, i.e. close to the fuselage. Support the model at this point on two fingertips (or - better - use the MPX CG gauge, # 69 3054); the model should now hang level. **Fig. B**

If the model does not balance level, the installed components (e.g. flight battery) can be re-positioned inside the fuselage. If this is still not sufficient, attach the appropriate quantity of trim ballast (lead or plasticene) to the fuselage nose or tail and secure it carefully. If the model is tail-heavy, fix the ballast at the fuselage nose; if the model is tail-heavy, attach the ballast at the tail end of the fuselage.

The **longitudinal dihedral** is the difference in degrees between the angle of incidence of the wing and of the tail. Provided that you work carefully and attach the wing and tailplane to the fuselage without gaps, the longitudinal dihedral will be correct automatically.

If you are sure that both these settings (CG and longitudinal dihedral) are correct, you can be confident that there will be no major problems when you test-fly the model. **Fig. C**

Control surfaces, control surface travels

The model will only fly safely, reliably and accurately if the control surfaces move freely and smoothly, follow the stick movements in the correct "sense", and move to the stated maximum travels. The travels stated in these instructions have been established during the test-flying programme, and we strongly recommend that you keep to them initially. You can always adjust them to meet your personal preferences later on.

Transmitter controls

The transmitter features two main sticks which the pilot moves to control the servos in the model, which in turn operate the control surfaces.

The functions are assigned according to Mode A, although other stick modes are possible.

The transmitter controls the control surfaces as follows:

Rudder (left / right)	**Fig. D**
Elevator (up / down)	**Fig. E**
Throttle (motor off / on)	**Fig. F**

Unlike the other controls, the throttle stick must not return to the neutral position automatically. Instead it features a ratchet so that it stays wherever you put it. Please read the instructions supplied with your radio control system for the method of setting up and adjusting the transmitter and receiving system.